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MODELING OF THE *AMYGDALUS SCOPARIA* GROWTH INDICES PLANTED AROUND THE ZOB-E-AHAN MANUFACTURE, ISFAHAN, IRAN

N. Boroumand[1], A. Jalalian[1], A.A. Besalatpour[3]
1 Department of Soil science, Faculty of Agriculture, Islamic Azad University- Khorasgan branch, Iran
[2] Department of Soil Science, College of Agriculture, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran
Corresponding Author E-mail:

INTRODUCTION

Variation in soil resource levels is common and is important to plants. At relatively large spatial scales, the resources available to plants change as the soil type changes, and this variation has well-known effects on the growth of plant species (Jackson and Caldwell, 1993). In fact, the soil characteristics and landscape features influence biodiversity and plant growth; conversely, patterns of biodiversity affect soil properties at different scales. Hence, it is important to determine these relationships for understanding ecosystem processes and to have a proper and sustainable management (Fu et al., 2004). Many studies have carried out during the last few years mainly concentrated on factors that influence plant growth in grassland or shrubland. To discern these complex relationships, various multivariate statistical analysis techniques can be employed. Nevertheless, to explain the physical effects of the variables on plant growth, linear regression would be preferable (Besalatpour et al., 2013). This study aimed to determine the effective factors influencing the vegetation cover densities of Amygdalus Scoparia using multiple linear regression (MLR) approach by determining some growth indices.

MATERIALS AND METHODS

The study area was part of the crop lands around the Zobe-e-Ahan manufacture (31° 37′ to 32° 39′ N and 49° 34′ to 50° 32′ E), Isfahan (central Iran). A stratified random sampling was designed using digital topography map in the environment of ArcGIS software and a total of 90 soil samples were collected from the depths 0-30 and 30-60 cm of soil surface. The positions of the sampling points were identified in the field using GPS (model: 76CSx). The soil samples were air-dried and ground to pass a 2-mm sieve. Soil organic matter (SOM) content, available phosphorus, pH, electrical conductivity (EC) calcium content, magnesium content, were determined. The plant growth indices including width and height of plants were measured in each sampling point by 4 replicates. Finally, parameters of Amygdalus scoparia growth index were estimated using stepwise regression and multiple regression in SPSS software. For assessing efficacy and accuracy of these regression models to estimate growth index, some statistical indices including mean absolute error (MAE) and efficacy factor (EF) were determined.

Results and discussion

Results of Pierson`s simple correlation test showed that available phosphorus in soils sampled from the 30-60 depth in turf had the highest correlation with plant indexes (R = 0.23). Comparing results of stepwise regression and multiple regression shows that these models have high error and low efficacy factor and even negative to estimate growth index. Regression of limitations is bad, it can make the non-linear relationships are not sure whether or not the relationship is linear. Models stepwise multiple linear regression and linear and non-linear relationships in both linear assumptions and calculations according to this assumption implies computing the parameters of these models, especially in complex relationships that are not reliable.

Keywords: Amygdalus scoparia, **gradual and multiple regression**

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